TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

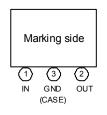
TA7805F,TA78057F,TA7806F,TA7807F,TA7808F,TA7809F TA7810F,TA7812F,TA7815F,TA7818F,TA7820F,TA7824F

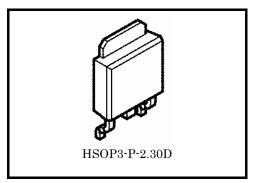
Output Current of 1A, Three Terminal Positive Voltage Regulators 5 V, 5.7 V, 6 V, 7 V, 8 V, 9 V, 10 V, 12 V, 15 V, 18 V, 20 V, 24 V

Features

- Internal overcurrent protection.
- Internal overheating protection.
- Maximum output current of 1 A.
- Packaged in New PW-Mold (Surface-mount type).

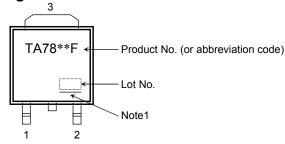
Pin Assignment





Weight HSOP3-P-2.30D: 0.36 g (typ.)

Marking



Note: The "**" part of each product number varies according to the output voltage of the product.

Note1: A line under a Lot No. identifies the indication of product Labels.

Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Ordering Method

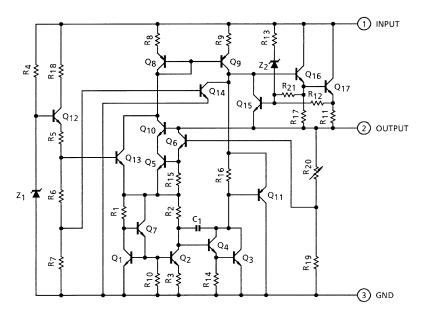
Product Name	Package (Lead Type)	Packing Form
TA78**F (TE16L1, NQ)	New PW-Mold: Surface-mount	Tape (2000 pcs ./ reel)

Note: The "*" in each pro-forma product name is replaced with the output voltage of each product.

The product(s) in this document ("Product") contain functions intended to protect the Product from temporary small overloads such as minor short-term overcurrent or overheating. The protective functions do not necessarily protect Product under all circumstances. When incorporating Product into your system, please design the system (1) to avoid such overloads upon the Product, and (2) to shut down or otherwise relieve the Product of such overload conditions immediately upon occurrence. For details, please refer to the notes appearing below in this document and other documents referenced in this document.



Equivalent Circuit



Absolute Maximum Ratings (Ta = 25°C)

Characteris	tics	Symbol	Rating	Unit
	TA7805F			
	TA78057F			
	TA7806F			
	TA7807F			
	TA7808F		35	
Input voltage	TA7809F	V _{IN}		V
input voitage	TA7810F	VIN		V
	TA7812F			
	TA7815F			
	TA7818F			
	TA7820F		40	
	TA7824F			
Output current		lout	1	Α
Power dissipation	(Ta = 25°C)	D-	1	W
Fower dissipation	(Tc = 25°C)	P _D	10	VV
Operating junction temp	perature	Tj _{opr}	-30 to 150	°C
Storage temperature		T _{stg}	-55 to 150	°C
Junction temperature		Tj	150	°C
Thermal resistance		R _{th (j-c)}	12.5	°C/W
Theiliai resistance		R _{th (j-a)}	125	C/VV

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



TA7805F Electrical Characteristics (Unless otherwise specified, V_{IN} = 10 V, I_{OUT} = 500 mA, 0°C \leq T_j \leq 125°C)

Characteristics	Symbol	Test Circuit		Test Condition	Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	4.8	5.0	5.2	V
Line regulation	Reg·line	1	T _i = 25°C	7.0 V ≤ V _{IN} ≤ 25 V	_	3	100	mV
Line regulation	Reguirle	'	$I_j = 25^{\circ}C$	8.0 V ≤ V _{IN} ≤ 12 V	_	1	50	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	15	100	mV
Load regulation	Negridad	'	1, - 25 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	5	50	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	$7.0 \text{ V} \le \text{V}_{\text{IN}} \le 20 \text{ V}$ 5.0 mA $\le \text{I}_{\text{OUT}} \le 1.0 \text{ A}$	4.75	_	5.25	V
Quiescent current	Ι _Β	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.2	8.0	mA
Quiescent current change	Δl _{Bl}	1	7.0 V ≤ V _{II} I _{OUT} = 5 n	7.0 V ≤ V _{IN} ≤ 25 V, I _{OUT} = 5 mA, T _i = 25°C		_	1.3	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	50	_	μV _{rms}
Ripple rejection	R.R.	3		r, 10 V ≤ V _{IN} ≤ 18 V mA, T _j = 25°C	57	73	_	dB
Dropout voltage	V_{D}	1	I _{OUT} = 1.0	A, T _j = 25°C	_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	1.6	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 n	nA	_	-0.6	_	mV/°C

TA78057F Electrical Characteristics (Unless otherwise specified, V_{IN} = 10.7 V, I_{OUT} = 500 mA, 0°C \leq T_i \leq 125°C)

Characteristics	Symbol	Test Circuit		Test Condition	Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	5.47	5.7	5.93	V
Line regulation	Reg·line	1	T _i = 25°C	7.7 V ≤ V _{IN} ≤ 25 V	_	4	110	mV
Line regulation	Reguline	'	1j - 25 C	8.7 V ≤ V _{IN} ≤ 12.7 V	_	2	55	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	15	110	mV
Load regulation	Regnoad	!	1, - 25 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	5	55	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	7.7 V ≤ V _{IN} ≤ 20.7 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	5.42	_	5.98	٧
Quiescent current	I _B	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.3	8.0	mA
Quiescent current change	Δl _{Bl}	1	7.7 V ≤ V _{II} I _{OUT} = 5 n	_N ≤ 25 V, nA, T _j = 25°C	_	_	1.3	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	55	_	μV _{rms}
Ripple rejection	R.R.	3		$x, 8.8 \text{ V} \le V_{\text{IN}} \le 18.8 \text{ V},$ mA, T _j = 25°C	56	72	_	dB
Dropout voltage	V _D	1	I _{OUT} = 1.0	A, T _j = 25°C	_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	1.5	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 n	nA	_	-0.7	_	mV/°C



TA7806F Electrical Characteristics (Unless otherwise specified, V_{IN} = 11 V, I_{OUT} = 500 mA, 0°C \leq T_j \leq 125°C)

Characteristics	Symbol	Test Circuit		Test Condition		Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	5.75	6.0	6.25	V
Line regulation	Reg·line	1	T _i = 25°C	8.0 V ≤ V _{IN} ≤ 25 V	_	4	120	mV
Line regulation	Regime	'	1, - 25 C	9.0 V ≤ V _{IN} ≤ 13 V	_	2	60	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	15	120	mV
Load regulation	Regnoad	'	1, - 25 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	5	60	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	8 V ≤ V _{IN} ≤ 21 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	5.7	_	6.3	V
Quiescent current	I _B	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.3	8.0	mA
Quiescent current change	ΔI _{BI}	1	8.0 V ≤ V _I I I _{OUT} = 5 r	8.0 V ≤ V _{IN} ≤ 25 V, I _{OUT} = 5 mA, T _i = 25°C		_	1.3	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	55	_	μV _{rms}
Ripple rejection	R.R.	3	f = 120 Hz, 11 V \leq V _{IN} \leq 19 V I _{OUT} = 50 mA, T _j = 25°C		56	72	_	dB
Dropout voltage	V _D	1	I _{OUT} = 1.0 A, T _j = 25°C		_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C	· · · · · · · · · · · · · · · · · · ·		1.5	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 r	nA	_	-0.7	_	mV/°C

TA7807F Electrical Characteristics (Unless otherwise specified, V_{IN} = 12 V, I_{OUT} = 500 mA, 0°C \leq T_i \leq 125°C)

Characteristics	Symbol	Test Circuit		Test Condition	Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	6.72	7.0	7.28	V
Line regulation	Pogulino	1	T _i = 25°C	9.0 V ≤ V _{IN} ≤ 25 V	_	5	140	mV
Line regulation	Reg·line	'	1] - 23 C	10 V ≤ V _{IN} ≤ 14 V	_	2	70	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	15	140	mV
Load regulation	Regiload	'	1j - 25 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	5	70	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	9.0 V ≤ V _{IN} ≤ 22 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	6.65	_	7.35	V
Quiescent current	Ι _Β	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.3	8.0	mA
Quiescent current change	Δl _{Bl}	1	9.0 V ≤ V _{II} I _{OUT} = 5 n	_N ≤ 25 V, nA, T _j = 25°C	_	_	1.3	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	60	_	μV _{rms}
Ripple rejection	R.R.	3		t, 12 V ≤ V _{IN} ≤ 20 V mA, T _j = 25°C	54	70	_	dB
Dropout voltage	V _D	1	I _{OUT} = 1.0	A, T _j = 25°C	_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	1.3	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 n	nA	_	-0.8		mV/°C



TA7808F Electrical Characteristics (Unless otherwise specified, V_{IN} = 14 V, I_{OUT} = 500 mA, $0^{\circ}C \le T_{j} \le 125^{\circ}C$)

Characteristics	Symbol	Test Circuit		Test Condition	Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	7.7	8.0	8.3	V
Line regulation	Reg·line	1	T _i = 25°C	10.5 V ≤ V _{IN} ≤ 25 V	_	6	160	mV
Line regulation	Regilile		1] - 23 C	11 V ≤ V _{IN} ≤ 17 V	_	2	80	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	12	160	mV
Load regulation	rteg load	'	1] - 23 0	250 mA ≤ I _{OUT} ≤ 750 mA	_	4	80	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	10.5 V ≤ V _{IN} ≤ 23 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	7.6	_	8.4	V
Quiescent current	IB	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.3	8.0	mA
Quiescent current change	Δl _{Bl}	1	10.5 V ≤ V I _{OUT} = 5 r	V _{IN} ≤ 25 V, nA, T _j = 25°C	_	_	1.0	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	70	_	μV _{rms}
Ripple rejection	R.R.	3		$x_{1}, 14 \text{ V} \le \text{V}_{\text{IN}} \le 21.5 \text{ V}$ mA, T _j = 25°C	53	69	_	dB
Dropout voltage	V _D	1	I _{OUT} = 1.0) A, T _j = 25°C	_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	1.1	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 r	nA	_	-1.0	_	mV/°C

TA7809F Electrical Characteristics (Unless otherwise specified, V_{IN} = 15 V, I_{OUT} = 500 mA, $0^{\circ}C \le T_{i} \le 125^{\circ}C$)

Characteristics	Symbol	Test Circuit		Test Condition		Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	8.64	9.0	9.36	V
Line regulation	Reg·line	1	T _i = 25°C	11.5 V ≤ V _{IN} ≤ 26 V	_	7.0	180	mV
Line regulation	Regaine	!	1] - 23 C	13 V ≤ V _{IN} ≤ 19 V	_	2.5	90	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	12	180	mV
Load regulation	Regiload	'	1, - 25 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	4	90	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	11.5 V ≤ V _{IN} ≤ 24 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	8.55	_	9.45	٧
Quiescent current	IB	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.3	8.0	mA
Quiescent current change	Δl _{Bl}	1	11.5 V ≤ V I _{OUT} = 5 r	/ _{IN} ≤ 26 V, nA, T _j = 25°C	_	_	1.0	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	75	_	μV _{rms}
Ripple rejection	R.R.	3	f = 120 Hz I _{OUT} = 50	f = 120 Hz, 15 V \leq V _{IN} \leq 22.5 V I _{OUT} = 50 mA, T _i = 25°C		67	_	dB
Dropout voltage	V_{D}	1	I _{OUT} = 1.0) A, T _j = 25°C	_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	1.0	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 r	mA	_	-1.1	_	mV/°C



TA7810F Electrical Characteristics (Unless otherwise specified, V_{IN} = 16 V, I_{OUT} = 500 mA, 0° C \leq T_{j} \leq 125°C)

Characteristics	Symbol	Test Circuit		Test Condition	Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	9.6	10.0	10.4	V
Line regulation	Reg·line	1	T _i = 25°C	12.5 V ≤ V _{IN} ≤ 27 V	_	8	200	mV
Line regulation	Regaine	!	1, - 25 C	14 V ≤ V _{IN} ≤ 20 V	_	2.5	100	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	12	200	mV
Load regulation	Negricau	!	1, - 25 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	4	100	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	12.5 V ≤ V _{IN} ≤ 25 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	9.5	_	10.5	٧
Quiescent current	IB	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.3	8.0	mA
Quiescent current change	Δl _{Bl}	1	12.5 V ≤ V I _{OUT} = 5 r	V _{IN} ≤ 27 V, nA, T _j = 25°C	_	_	1.0	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	80	_	μV _{rms}
Ripple rejection	R.R.	3		$x_{1}, 16 \text{ V} \le \text{V}_{\text{IN}} \le 23.5 \text{ V}$ mA, T _j = 25°C	50	66	_	dB
Dropout voltage	V_{D}	1	I _{OUT} = 1.0) A, T _j = 25°C	_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	0.9	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 r	nA	_	-1.3	_	mV/°C

TA7812F Electrical Characteristics (Unless otherwise specified, V_{IN} = 19 V, I_{OUT} = 500 mA, $0^{\circ}C \le T_{i} \le 125^{\circ}C$)

Characteristics	Symbol	Test Circuit		Test Condition	Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	11.5	12.0	12.5	V
Line regulation	Reg·line	1	T _i = 25°C	14.5 V ≤ V _{IN} ≤ 30 V	_	10	240	mV
Line regulation	Negrille	'	1] - 23 C	16 V ≤ V _{IN} ≤ 22 V	_	3	120	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	12	240	mV
Load regulation	Regiload	'	1, - 25 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	4	120	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	14.5 V ≤ V _{IN} ≤ 27 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	11.4	_	12.6	V
Quiescent current	Ι _Β	1	T _j = 25°C,	T _j = 25°C, I _{OUT} = 5 mA		4.3	8.0	mA
Quiescent current change	Δl _{Bl}	1	14.5 V ≤ V I _{OUT} = 5 n	′ _{IN} ≤ 30 V, nA, T _j = 25°C	_	_	1.0	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	90	_	μV _{rms}
Ripple rejection	R.R.	3		t, 19 V ≤ V _{IN} ≤ 25 V mA, T _j = 25°C	50	66	_	dB
Dropout voltage	V _D	1	I _{OUT} = 1.0 A, T _j = 25°C		_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	0.7	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 n	nA	_	-1.6		mV/°C



TA7815F Electrical Characteristics (Unless otherwise specified, V_{IN} = 23 V, I_{OUT} = 500 mA, 0° C \leq T_{j} \leq 125°C)

Characteristics	Symbol	Test Circuit		Test Condition	Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	14.4	15.0	15.6	V
Line regulation	Reg·line	1	T _i = 25°C	17.5 V ≤ V _{IN} ≤ 30 V	_	11	300	mV
Line regulation	Regime	!	1, - 25 C	20 V ≤ V _{IN} ≤ 26 V	_	3	150	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	12	300	mV
Load regulation	Negricad	!	1, - 25 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	4	150	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	17.5 V ≤ V _{IN} ≤ 30 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	14.25	_	15.75	V
Quiescent current	I _{BI}	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.4	8.0	mA
Quiescent current change	Δl _B	1	17.5 V ≤ V I _{OUT} = 5 r	/ _{IN} ≤ 30 V, nA, T _j = 25°C	_	_	1.0	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	110	_	μV _{rms}
Ripple rejection	R.R.	3	f = 120 Hz I _{OUT} = 50	$x_{1}, 23 \text{ V} \le \text{V}_{\text{IN}} \le 28.5 \text{ V}$ mA, T _j = 25°C	49	65	_	dB
Dropout voltage	V_{D}	1	I _{OUT} = 1.0) A, T _j = 25°C	_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	0.5	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 r	nA	_	-2.0	_	mV/°C

TA7818F Electrical Characteristics (Unless otherwise specified, V_{IN} = 27 V, I_{OUT} = 500 mA, 0° C \leq T_{i} \leq 125°C)

Characteristics	Symbol	Test Circuit		Test Condition	Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C,	I _{OUT} = 100 mA	17.3	18.0	18.7	V
Line regulation	Reg·line	1	T _i = 25°C	21 V ≤ V _{IN} ≤ 33 V	_	13	360	mV
Line regulation	Regille	'	1j - 25 C	24 V ≤ V _{IN} ≤ 30 V	_	4	180	IIIV
Load regulation	Reg·load	1	T _i = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	12	360	mV
Load regulation	Negridad	'	1] - 23 C	250 mA ≤ I _{OUT} ≤ 750 mA	_	4	180	IIIV
Output voltage	V _{OUT}	1	T _j = 25°C	21 V \leq V _{IN} \leq 33 V 5.0 mA \leq I _{OUT} \leq 1.0 A	17.1	_	18.9	V
Quiescent current	I _B	1	T _j = 25°C,	I _{OUT} = 5 mA	_	4.5	8.0	mA
Quiescent current change	Δl _{Bl}	1	21 V ≤ V _{IN} I _{OUT} = 5 n	ı ≤ 33 V, nA, T _j = 25°C	_	_	1.0	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, I _{OUT} = 50	10 Hz ≤ f ≤ 100 kHz mA	_	125	_	μV _{rms}
Ripple rejection	R.R.	3		z, 27 V ≤ V _{IN} ≤ 32 V mA, T _j = 25°C	47	63	_	dB
Dropout voltage	V_{D}	1	I _{OUT} = 1.0	A, T _j = 25°C	_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	0.4	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 n	nA	_	-2.5	-	mV/°C



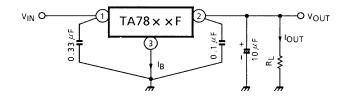
TA7820F Electrical Characteristics (Unless otherwise specified, V_{IN} = 29 V, I_{OUT} = 500 mA, 0° C \leq T_{j} \leq 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C, I _{OUT} = 100 mA		19.2	20.0	20.8	V
Line regulation	Reg·line	1	T _j = 25°C	23 V ≤ V _{IN} ≤ 35 V	_	15	400	- mV
				26 V ≤ V _{IN} ≤ 32 V	_	5	200	
Load regulation	Reg·load	1	T _j = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	12	400	- mV
				250 mA ≤ I _{OUT} ≤ 750 mA	_	4	200	
Output voltage	V _{OUT}	1	T _j = 25°C	23 V ≤ V _{IN} ≤ 35 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	19.0	_	21.0	٧
Quiescent current	ΙΒ	1	T _j = 25°C, I _{OUT} = 5 mA		_	4.6	8.0	mA
Quiescent current change	Δl _{Bl}	1	23 V ≤ V _{IN} ≤ 35 V, I _{OUT} = 5 mA, T _j = 25°C		_	_	1.0	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, 10 Hz ≤ f ≤ 100 kHz I _{OUT} = 50 mA		_	135	_	μV _{rms}
Ripple rejection	R.R.	3	$f = 120 \text{ Hz}, 29 \text{ V} \le \text{V}_{\text{IN}} \le 34 \text{ V}$ $\text{I}_{\text{OUT}} = 50 \text{ mA}, T_{j} = 25^{\circ}\text{C}$		45	61	_	dB
Dropout voltage	V_{D}	1	I _{OUT} = 1.0 A, T _j = 25°C		_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	0.4	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 mA		_	-3.0	_	mV/°C

TA7824F Electrical Characteristics (Unless otherwise specified, V_{IN} = 33 V, I_{OUT} = 500 mA, 0°C \leq T_j \leq 125°C)

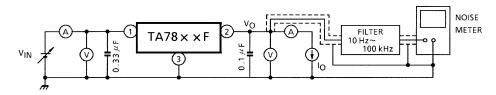
Characteristics	Symbol	Test Circuit	Test Condition		Min	Тур.	Max	Unit
Output voltage	V _{OUT}	1	T _j = 25°C, I _{OUT} = 100 mA		23.0	24.0	25.0	V
Line regulation	Reg·line	1	T _j = 25°C	27 V ≤ V _{IN} ≤ 38 V	_	18	480	- mV
				30 V ≤ V _{IN} ≤ 36 V	_	6	240	
Load regulation	Reg·load	1	T _j = 25°C	5 mA ≤ I _{OUT} ≤ 1.4 A	_	12	480	mV
				250 mA ≤ I _{OUT} ≤ 750 mA	_	4	240	
Output voltage	V _{OUT}	1	T _j = 25°C	27 V ≤ V _{IN} ≤ 38 V 5.0 mA ≤ I _{OUT} ≤ 1.0 A	22.8	_	25.2	٧
Quiescent current	IB	1	T _j = 25°C, I _{OUT} = 5 mA		_	4.6	8.0	mA
Quiescent current change	Δl _{Bl}	1	$27 \text{ V} \le \text{V}_{\text{IN}} \le 38 \text{ V},$ $\text{I}_{\text{OUT}} = 5 \text{ mA}, \text{T}_{j} = 25^{\circ}\text{C}$		_	_	1.0	mA
Output noise voltage	V _{NO}	2	Tj = 25°C, 10 Hz \leq f \leq 100 kHz I _{OUT} = 50 mA		_	150	_	μV _{rms}
Ripple rejection	R.R.	3	$f = 120 \text{ Hz}, 33 \text{ V} \le \text{V}_{\text{IN}} \le 38 \text{ V}$ $\text{I}_{\text{OUT}} = 50 \text{ mA}, T_{j} = 25^{\circ}\text{C}$		45	61	_	dB
Dropout voltage	V_{D}	1	I _{OUT} = 1.0 A, T _j = 25°C		_	2.0	_	V
Short circuit current limit	I _{SC}	1	T _j = 25°C		_	0.3	_	Α
Average temperature coefficient of output voltage	T _{CVO}	1	I _{OUT} = 5 mA		_	-3.5	_	mV/°C

Test Circuit 1 / Standard Application Circuit



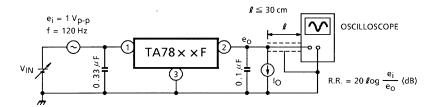
Test Circuit 2

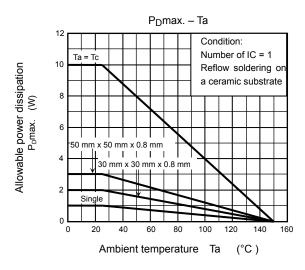
 V_{NO}

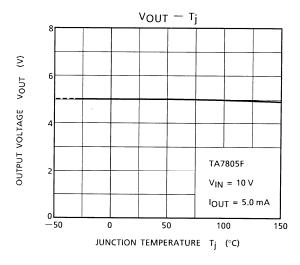


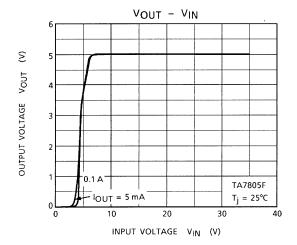
Test Circuit 3

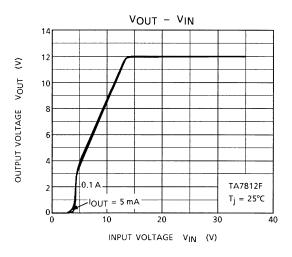
R.R.

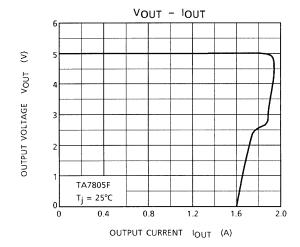


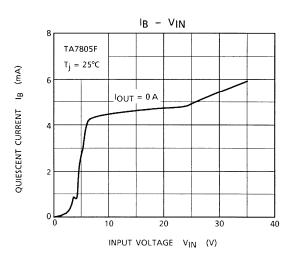


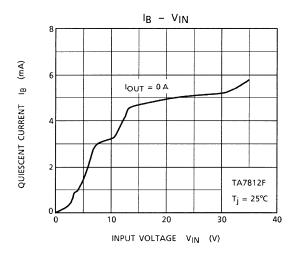


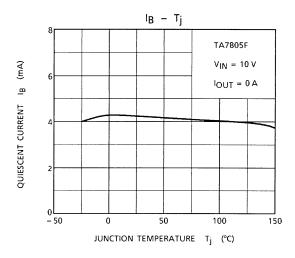


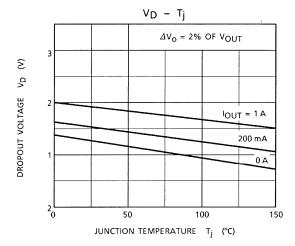


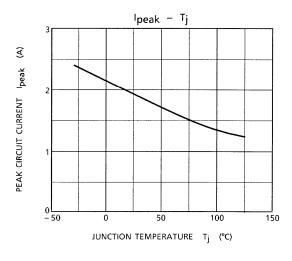


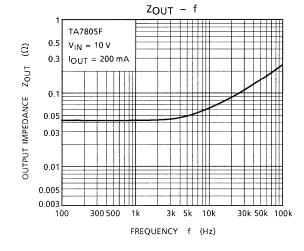


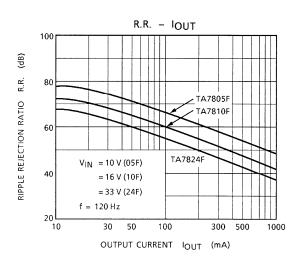


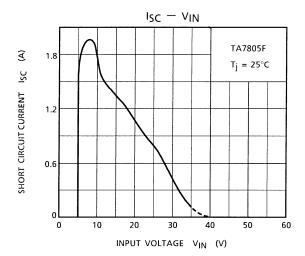












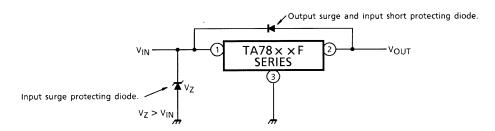


Usage Precautions

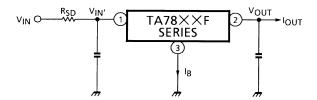
- (1) In regard to GND, be careful not to apply a negative voltage to the input/output terminal.
- (2) If a surge voltage exceeding the absolute maximum rating is applied to the input terminal or if a voltage in excess of the input terminal voltage is applied to the output terminal, the circuit may be destroyed.

Particular care is necessary in the case of the latter.

Circuit destruction may also occur if the input terminal shorts to GND in a state of normal operation, causing the output terminal voltage to exceed the input voltage (GND potential) and the electrical charge of the chemical capacitor connected to the output terminal to flow into the input side. Where these risks exist, take steps such as connecting zener and general silicon diodes to the circuit, as shown in the figure below.



(3) When the input voltage is too high, the power dissipation of the three-terminal regulator, which is a series regulator, increases, causing the junction temperature to rise. In such a case, it is recommended to reduce the power dissipation, and hence the junction temperature, by inserting a power-limiting resistor RSD in the input terminal.



The power dissipation PD of the IC is expressed in the following equation.

$$P_D = (V_{IN'} - V_{OUT}) \cdot I_{OUT} + V_{IN'} \cdot I_B$$

Reducing V_{IN} below the lowest voltage necessary for the IC will cause ripple, deterioration in output regulation and, in certain circumstances, parasitic oscillation.

To determine the resistance value of RSD, design with a margin, referring to the following equation.

$$R_{SD} < \frac{V_{IN} - V_{IN'}}{I_{OUT} + I_{B}}$$

(4) Be sure to connect a capacitor near the input terminal and output terminal between both terminals and GND. The capacitances should be determined experimentally because they depend on PCB patterns. In particular, adequate investigation should be made to ensure there is no problem even in high or low temperatures.

(5) The molded plastic portion of this unit, measuring 5.5 mm (L) by 6.5 mm (W) by 2.3 mm (T), is more compact compared to its equivalent TO-220.

The GND fin extends directly out of the main body, and can be soldered directly to the ceramic circuit board for significant increase in power dissipation.

To obtain high reliability in the heat sink design of the regulator IC, it is generally required to derate more than 20% of maximum junction temperature (T_j max).

Further, full consideration should be given to the installation of IC on a heat sink.

· Low voltage

Do not apply voltage to the Product that is lower than the minimum operating voltage, or the Product's protective functions will not operate properly and the Product may be permanently damaged.

• Overcurrent Protection

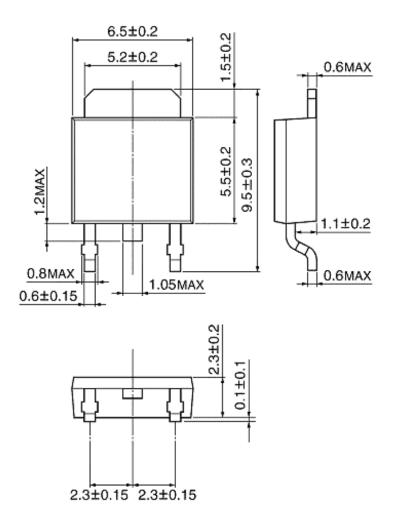
The overcurrent protection circuits in the Product are designed to temporarily protect Product from minor overcurrent of brief duration. When the overcurrent protective function in the Product activates, immediately cease application of overcurrent to Product. Improper usage of Product, such as application of current to Product exceeding the absolute maximum ratings, could cause the overcurrent protection circuit not to operate properly and/or damage Product permanently even before the protection circuit starts to operate.

Overheating Protection

The thermal shutdown circuits in the Product are designed to temporarily protect Product from minor overheating of brief duration. When the overheating protective function in the Product activates, immediately correct the overheating situation. Improper usage of Product, such as the application of heat to Product exceeding the absolute maximum ratings, could cause the overheating protection circuit not to operate properly and/or damage Product permanently even before the protection circuit starts to operate.

Package Dimensions

HSOP3-P-2.30D Unit: mm



Weight: 0.36 g (typ.)



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